

CLAIMS

What is claimed is:

1. A process for oxidizing nitric oxide comprising:

a) providing a stream of nitric oxide;

b) providing a heated surface within said stream of nitric oxide;

c) providing a hydrogen peroxide solution; and

d) impinging said hydrogen peroxide solution onto said heated surface, whereby said

hydrogen peroxide solution is decomposed into a plurality of oxidative free radicals which further oxidize said nitric oxide to form nitrogen dioxide.

2. The process of claim 1, wherein said hydrogen peroxide solution contains 50 wt.% or less hydrogen peroxide.

3. The process of claim 1, wherein said heated surface is heated to a temperature of 200-500°C.

4. The process of claim 1, wherein said heated surface contains a catalytic coating.

5. The process of claim 4, wherein said catalytic coating contains an element selected

from the group comprising iron, chromium, copper, platinum, silver and palladium.

6. The process of claim 4, wherein said catalytic coating contains an oxide selected from the group comprising silver oxide, iron oxide, ruthenium oxide, glass, quartz, Mo glass,  $Fe_3-xMn_xO_4$  spinels,  $Fe_2O_3$  with Cu ferrite,  $MgO$  and  $Al_2O_3$ .

7. The process of claim 1, wherein said stream of nitric oxide contains 50-350 ppm nitric oxide.

8. The process of claim 1, wherein said plurality of oxidative free radicals is selected from the group comprising hydroxyl radicals and hydroperoxyl radicals.

5        9. The process of claim 1, further comprising the step of heating said hydrogen peroxide solution before impinging said hydrogen peroxide solution onto said heated surface.

10      10. The process of claim 9, wherein said hydrogen peroxide solution is heated to a temperature of 140°C before impinging said hydrogen peroxide solution onto said heated surface.

11      11. A system for oxidizing nitric oxide comprising,  
a) a pipe containing a gas stream of nitric oxide;  
b) a structure disposed in said nitric oxide gas stream, said structure including a surface;  
c) a first heater for heating said surface of said structure; and  
d) an injection nozzle disposed in said pipe and positioned to impinge a hydrogen peroxide solution onto said surface of said structure to decompose said solution into a plurality of oxidative free radicals which further oxidize said nitric oxide to form nitrogen dioxide.

20      12. The system of claim 11, further comprising a second heater for heating said nozzle so that hydrogen peroxide solution therein is heated prior to being impinged onto said heated surface.

25      13. The system of claim 11, wherein said first heater is selected to heat said surface to a temperature of 200-500°C.

14. The system of claim 11, wherein said surface of said structure includes a catalytic coating.

5       15. The system of claim 14, wherein said catalytic coating contains an element selected from the group comprising iron, chromium, copper, platinum, silver and palladium.

16. The system of claim 14, wherein said catalytic coating contains an oxide selected from the group comprising silver oxide, iron oxide, ruthenium oxide, glass, quartz, Mo glass,  $\text{Fe}_{3-x}\text{Mn}_x\text{O}_4$  spinels,  $\text{Fe}_2\text{O}_3$  with Cu ferrite,  $\text{MgO}$  and  $\text{Al}_2\text{O}_3$ .

17. The system of claim 11, wherein said stream of nitric oxide contains 50-350 ppm nitric oxide.

18. The system of claim 11, wherein said structure comprises a block.

19. The system of claim 11, further comprising a tank of hydrogen peroxide solution, a supply tube connecting said tank to said nozzle and a pump for supplying said hydrogen peroxide solution through said supply tube to said nozzle.

20       20. The system of claim 19, wherein said hydrogen peroxide solution contains 50 wt.% or less hydrogen peroxide.